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A potential benefit of increasing book–tax conformity: evidence from the reduction in audit fees

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Abstract Our study explores a possible benefit of conforming book income to taxable income. We expect that increased book–tax conformity can reduce audit fees by simplifying tax accruals and increasing tax authorities' monitoring, which reduce audit workload and audit risk, respectively. Consistent with our expectations, we find that a higher country level of required book–tax conformity leads to lower audit fees. Moreover, firm-level book–tax differences are positively associated with audit fees. We also find that the negative association between country level of required book–tax conformity and audit fees is mitigated among firms with larger book–tax differences. Our findings are robust to including country-level legal investor protection or other extra-legal institutions. Overall, our results suggest that one benefit of increasing book–tax conformity is the reduction in audit fees.

Keywords Audit fee · Book–tax conformity · Book–tax difference · Legal institution · Extra-legal institution

JEL Classification H2 · M4

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1 Introduction

Our study explores whether increased country-level of required book–tax conformity results in lower audit fees. We also explore how firm-level book–tax differences affect the association between audit fees and country-level of required book–tax conformity.[1] There is an ongoing debate in the literature and among policymakers about whether two sets of income measures, book and tax, should conform to one common measure. Specifically, in the United States, the growing divergence between book and taxable incomes has attracted much attention and analysis (Mills et al. 2002; Plesko 2002; Desai 2003; Hanlon and Shevlin 2005). This expanding divergence raises concerns about misleading financial or tax reporting because it signals that firms may increasingly overstate book income or understate tax liability.

A way to mitigate these concerns is to increase the required conformity between book and taxable income measures, because book–tax conformity increases the cost for firms to simultaneously manage taxable income downward and book income upward (Yin 2001; Desai 2005). Therefore book–tax conformity has emerged in policy circles as a means of reducing the perceived ability of firms to manage earnings and evade taxes. Both regulators[2] and academics have called for more research to explore the consequences of conforming book income and taxable income (Shackelford and Shevlin 2001; Shevlin 2002; Hanlon and Heitzman 2010).

Prior studies primarily focus on investigating whether there is a decrease in information in accounting earnings after book–tax conformity increases (e.g., Hanlon and Shevlin 2005; Plesko 2006; Shackelford 2006; Hanlon et al. 2008). While research methods differ, these studies essentially document a substantial cost of conformity in terms of information loss in financial accounting earnings. However, the benefits of increasing book–tax conformity are underexplored and evidence is either anecdotal (e.g., Yin 2001; Desai 2005) or from survey studies (e.g., Slemrod and Blumenthal 1996). Moreover, most studies develop their analyses from the perspective of investors, while other market participants, such as auditors, are largely ignored. In this respect, we expect that one benefit of increasing book–tax conformity would be lower audit fees.

Specifically, increased conformity can simplify tax accruals and thereby reduce audit workload because tax accruals introduce substantial complexity to the audit of financial statements. In addition, increased conformity can reduce audit risk by increasing the incentive of tax authorities to scrutinize financial statements, which reduces managers' incentives to manage earnings. The resulting lesser manipulation

[1] Throughout our study, book–tax conformity represents the required degree of book income alignment with taxable income. It is measured at the country level, using the approach of Atwood et al. (2010). In contrast, the book–tax difference represents the spread between the book income and taxable income a firm reports and is measured at the firm level.

[2] For example, the Tax Reform Panel, established by President Bush, calls for more research to better understand the consequences of adopting book–tax conformity (Hanlon et al. 2008). More recently, one of the primary goals of President Obama's 2012 framework for corporate tax reform is to "reduce the gap between book income, reported to shareholders, and taxable income, reported to the IRS" (U.S. Treasury 2012, p. 10), suggesting that the book–tax conformity debate still matters to policymakers in the United States and abroad.

of financial reporting implies that auditors would bear a lower risk of not detecting clients' misstatements. For these reasons, we expect a negative association between book–tax conformity and audit fees.

Furthermore, we expect that the negative association between country-level book–tax conformity and audit fees is mitigated among firms with larger book–tax differences, because firm-level book–tax differences likely stem from earnings management or tax aggressiveness and result in concerns for auditors. In addition, increased country-level conformity amplifies such auditor concerns by highlighting the effects of earnings management and tax aggressiveness on firm-level book–tax differences.

To test our expectations, we regress audit fees on a measure of country-level book–tax conformity, firm-level book–tax difference, their interaction, and several firm-level as well as country-level determinants of audit fees. Our study uses international data because this setting provides not only substantial variation in book–tax conformity but also an extensive sample that makes our results more general than those from exploring a specific country (e.g., Hanlon et al. 2008). Following Atwood et al. (2010), we measure book–tax conformity with the amount of variation in current tax expense that cannot be explained by the variation in pre-tax earnings.

Using a panel of 136,209 firm–year observations across 34 countries, we find that country-level book–tax conformity is negatively associated with audit fees. Moreover, firm-level book–tax differences are positively associated with audit fees, consistent with the finding of Hanlon et al. (2012). We also find that firm-level book–tax differences mitigate the negative association between audit fees and country-level book–tax conformity. All these results are consistent with our expectations. Our results suggest that the magnitude of the reduction in audit fees due to increased book–tax conformity is economically significant. Specifically, a 10 % increase in our measure of book–tax conformity explains about a $12,862 reduction in audit fees, which represents about 2.6 % of our sample mean audit fees of $495,714.

As a supplementary test, we find that increased book–tax conformity leads to lower deferred tax expenses and a lower audit pricing of factors reflecting tax complexity. These findings suggest that book–tax conformity can reduce audit effort. Moreover, increased conformity is associated with a lower likelihood of financial restatements, which suggests that it can motivate tax authorities to scrutinize financial statements and that the resulting lesser managerial manipulation of financial reporting implies lower audit risk. We also find that reduced audit risk seems to explain more about how book–tax conformity decreases audit fees than reduced audit effort does.

We perform a series of robustness checks. The results show that our findings are not sensitive to sample concentration on any specific country or how we measure country-level book–tax conformity or firm-level book–tax differences. In addition, our country-level book–tax conformity measure does not merely capture the effect of firm-level book–tax differences. To address the concern that our findings about book–tax conformity reflect the effects of other country-level institutional features, we repeat our test by including both legal and extra-legal institutional variables explored in prior studies (Leuz et al. 2003; Haw et al. 2004). We find that

considering these additional institutions does not change our conclusions. Therefore our measure of book–tax conformity does not reflect the effect of cross-country variations in other institutional features. We also find that our argument that firm-level book–tax differences mitigate the negative association between audit fees and country-level book–tax conformity holds, regardless of whether book–tax differences are due to tax aggressiveness or earnings management.

Our study contributes to the literature in the following ways. First, our results contribute to the book–tax conformity debate. Hanlon and Heitzman (2010) call for more research about the costs and benefits of book–tax conformity.[3] Our study responds to their call by showing that one benefit of increasing book–tax conformity is the reduction in audit fees. Our finding is particularly relevant because prior studies usually focus on exploring the cost of book–tax conformity, such as the information loss in accounting earnings, but very few studies provide empirical evidence of the benefits conformity generates. Hence our study should be of interest to academics and policymakers in considering the consequences, especially the benefits, of conforming book income and taxable income.

Second, our research contributes to the auditing literature by introducing a new determinant of audit fees. Our results suggest that country-level required book–tax conformity is an important institution that reduces audit fees. While previous studies find that country-level institutional features, such as legal regimes concerning auditors' litigation risk (Choi et al. 2008, 2009), can explain audit fees, to our best knowledge, our study is the first to document that book–tax conformity can also explain these fees.

Finally, our results suggest that the positive association between firm-level book–tax differences and audit fees holds not only in the United States but also in other countries. This finding extends the work of Hanlon et al. (2012) to an international context. In addition, we find that cross-country variations in legal and extra-legal institutions affect the association between firm-level book–tax differences and audit fees. These findings differentiate our study from that of Hanlon et al. (2012) and bring new insight to the literature.

The rest of the paper is organized as follows. The next section develops our hypothesis. Section 3 describes our empirical design and sample selection. Section 4 discusses the empirical results. Section 5 describes robustness tests and additional analysis, and Sect. 6 concludes.

2 Hypothesis development

2.1 Country-level book–tax conformity and audit fees

In a dual reporting system, financial accounting income and taxable income are characterized by different revenue and expense recognition criteria. This feature gives managers the discretion to report different book and taxable incomes (e.g.,

[3] Hanlon and Heitzman (2010) call for more research by stating: "the evidence suggests there will be a substantial cost in terms of the information loss in accounting earnings should book–tax conformity be adopted. We have little evidence about anything else…. Further evidence on a broader set of costs and benefits would be valuable to inform this debate" (p. 136).

using different depreciation methods or lifespans for book and tax purposes) while introducing substantial complexity to auditing financial statements. By eliminating such reporting discretion, increased book–tax conformity can lead to lower audit fees for two reasons. First, increased conformity reduces audit workload by simplifying tax accruals[4] (i.e., reducing deferred tax expenses). Second, it reduces audit risk by motivating tax authorities to scrutinize financial statements, which deters the managerial manipulation of financial reporting and thereby leads to fewer audit failures.

Specifically, auditing tax accruals is a difficult task that requires familiarity with both financial accounting treatments and tax laws.[5] When auditing tax accruals, more effort in understanding related tax law and greater tax specialist involvement are needed, both of which lead to higher audit costs (Donohoe and Knechel 2014). In addition, tax laws usually require firms to maintain detailed records to support the legitimacy of recognizing tax deductions[6] and checking these records is complicated, given their typically huge volume.

Increased book–tax conformity can save audit workload by eliminating the gaps between tax laws and accounting rules, which simplifies tax accruals as well as the accounting for income taxes. The reduction in tax accruals can substantially reduce audit complexity, given the intricacy in auditing tax accruals. Hence auditors can exert less effort to check whether, for example, the deferred tax liability for depreciation differences is correctly accrued. For these reasons, increased book–tax conformity can lead to lower audit fees.[7]

Moreover, by eliminating the discretion to report different book and taxable incomes, increased book–tax conformity can motivate tax authorities to scrutinize financial statements. When book–tax conformity is high, financial statements are taken as the basis for taxation, so tax authorities will rigorously examine financial statements (Tendeloo and Vanstraelen 2008). In this regard, increased book–tax conformity leads tax authorities to act as an additional monitor of financial reports.

[4] Tax accruals can be broadly defined as book income tax expenses minus cash taxes paid. In this regard, increased book-tax conformity can simplify tax accruals because increased conformity can reduce deferred tax expenses and deferred tax expenses are a major component of tax accruals.

[5] Badertscher et al. (2009) report that accounting for income taxes is often associated with financial restatement. A more recent study (Ernst & Young 2011) also finds that 11 % of Fortune Global 500 companies report tax deficiencies as the primary driver of restatements. These results suggest the complication of the accounting for income tax expenses, underscoring the difficulty in auditing tax accruals (Schwab 2009; Raedy et al. 2011).

[6] For example, to determine tax depreciation, tax law generally requires firms to keep records of each asset's cost, depreciation method, and annual depreciation. Auditing these records is usually difficult, especially when the country implements an alternative minimum tax system and tax depreciation methods are different for regular and alternative minimum taxes (e.g., the case of the United States).

[7] Survey evidence suggests that the disconformity of book and taxable incomes complicates the preparation of tax returns but that this complication can be mitigated by increasing book–tax conformity (Slemrod and Blumenthal 1996; Slemrod 1997, 2006). Note that, if preparing tax returns is complicated, then auditing tax expenses and tax deductions underlying tax returns could be also complicated. Given that increased book–tax conformity can reduce the complication in preparing tax returns, it is natural to expect that it can also reduce the complexity in auditing tax expenses and deductions and thereby reduce audit workload.

The increased monitoring from tax authorities can reduce audit risk by deterring managers from manipulating financial reporting.

Specifically, due to its tax claim on a firm's profit, the government has an interest in determining the "true" profit earned by companies (Dyck and Zingale 2004; Hanlon et al. 2014). Because managerial self-dealing reduces the profits shared by the government, the tax authority has an incentive to monitor managers to discourage self-dealing (e.g., Dyck and Zingale 2004; Haw et al. 2004; Desai et al. 2007; Guedhami and Pittman 2008; El Ghoul et al. 2011).[8] In this regard, increased book–tax conformity motivates tax authorities to scrutinize financial statements, while such scrutiny prevents managers from concealing their self-dealing through financial reporting manipulation (Fan and Wong 2002). The resulting lesser manipulation implies that auditors bear a lower risk of not detecting clients' financial reporting misstatements (i.e., fewer audit failures). Accordingly, increased book–tax conformity can reduce audit risk.

In sum, increased book–tax conformity can reduce audit workload by simplifying tax accruals. It can also reduce audit risk because, in addition to auditors, tax authorities will also monitor the book–tax system and their monitoring can deter the managerial manipulation of financial reporting. For these two reasons, we expect higher book–tax conformity to lead to lower audit fees. We hereby develop our first hypothesis, as follows.

H1: Ceteris paribus, higher country-level required book–tax conformity leads to lower audit fees.

Note that Blaylock et al. (2015) find that higher book–tax conformity is associated with more earnings management. Their finding suggests a positive relation between book–tax conformity and audit fees, since clients' earnings management results in concerns for auditors, for which auditors may conduct more work and charge higher fees in compensation. In this regard, their result could bias our test against finding a negative relation between book–tax conformity and audit fees if auditors perceive that the increased earnings management dominates the advantages of book–tax conformity.

2.2 Effect of firm-level book–tax differences on the association between audit fees and country-level book–tax conformity

In this section, we incorporate firm-level book–tax differences into our analysis. We expect the effect of country-level book–tax conformity on reducing audit fees to be alleviated among firms with large book–tax differences, because firm-level book–tax differences are likely due to earnings management or tax aggressiveness and result in concerns for auditors.

[8] Prior studies report that tax authorities' monitoring leads to less accrual manipulation (Haw et al. 2004), lower costs of debt (Guedhami and Pittman 2008), and lower costs of equity (El Ghoul et al. 2011). Dyck and Zingale (2004) find that stronger monitoring by tax authorities leads to lower private benefits of control. Similarly, Desai et al. (2007) also find that stronger tax enforcement leads to lower voting premiums on stocks.

Specifically, Hanlon (2005) notes that firm-level book–tax differences can result from tax aggressiveness, earnings management, or mechanical reasons that arise because different rules govern the calculation of book income and taxable income. Hanlon et al. (2012) find that book–tax differences are associated with higher audit fees, since they represent an observable proxy for earnings management (Heltzer and Shelton 2011). Donohoe and Knechel (2014) find that tax-aggressive firms pay higher audit fees due to potential tax authorities' challenges on their aggressive tax positions that expose their auditors to litigation, regulatory, and reputational costs. These results suggest that auditors charge fee premiums for clients' book–tax differences due to concerns about earnings management or tax aggressiveness embodied in the book–tax differences.[9]

Furthermore, book–tax conformity eliminates the gaps in the calculation of book income and taxable income. Consequently, because of the increased country-level book–tax conformity, there are fewer firm-level book–tax differences due to mechanical reasons, which makes firm-level book–tax differences a clear indication of earnings management or tax aggressiveness. In addition, higher book–tax conformity increases tax authorities' incentives to challenge auditees' book–tax differences (Mills 1998; Chan et al. 2010).[10] Such challenges can introduce additional concerns for auditors because firm-level book–tax differences in an environment with a higher level of required book–tax conformity are more likely to reflect tax aggressiveness (Donohoe and Knechel 2014).

The discussion above suggests that clients' book–tax differences result in concerns for auditors. Such concerns are more salient when required book–tax conformity is high, because increased country-level book–tax conformity highlights the effects of earnings management and tax aggressiveness on firm-level book–tax differences. Therefore we expect that the negative association between country-level required book–tax conformity and audit fees is mitigated among firms with larger book–tax differences. We thus develop our second hypothesis, as follows.

H2: Ceteris paribus, the negative relation between country-level required book–tax conformity and audit fees is mitigated among firms with larger book–tax differences.

[9] Prior studies suggest that book–tax differences help identify firms in financial distress (Jones and Noga 2009) or earnings fraud (Ettredge et al. 2008). Because these actions increase the risk of misstatements, restatements, and lawsuits (Heninger 2001), auditors will adjust their efforts and fees to control for the resulting higher risk.

[10] Chan et al. (2010) find that in a highly book–tax-conforming period in China, the gap between book and taxable incomes serves as a detection mechanism for tax noncompliance and hence is more likely to trigger tax authorities' examinations. Similarly, Mills (1998) finds that larger book–tax differences lead to more audit proposals and adjustments required by tax authorities.

3 Research design

3.1 Measure of book–tax conformity

The ideal research design for examining our issue depends heavily on a reliable proxy for book–tax conformity. However, prior studies measuring book–tax conformity typically follow an indicator variable approach based on subjective assessments of each country's book–tax conformity (e.g., Hung 2001). Unfortunately, such a dichotomous indicator is oversimplified and its interpretation is likely to be confounded by the effects of other country-level institutions (e.g., legal origin; see Atwood et al. 2010).

To avoid this problem, we follow Atwood et al. (2010) to measure book–tax conformity based on the proportion of current tax expense that cannot be explained by pre-tax book income. Atwood et al. reason that countries that allow greater flexibility in the reporting of taxable income, given a particular level of pre-tax book income, have lower required book–tax conformity. Accordingly, we also define book–tax conformity as the flexibility in reporting taxable income that differs from pre-tax book income. We measure book–tax conformity with the conditional variance of current tax expense in Eq. (1):

$$CTE = \theta_0 + \theta_1 PTBI + \theta_2 ForPTBI + \theta_3 DIV + e, \quad (1)$$

where *CTE* is current tax expense, including both domestic and foreign current tax expenses[11]; *PTBI* is pre-tax book income; *ForPTBI* is the estimated foreign pre-tax book income (foreign tax expense/total tax expense × *PTBI*); *DIV* is total dividends; and *e* is the disturbance term. We scale *CTE*, *PTBI*, *ForPTBI*, and *DIV* by total assets.

Our measure of book–tax conformity is calculated as the scaled ranking of the root mean squared errors (RMSEs) obtained from country-year estimates of Eq. (1). The RMSE from Eq. (1) represents the standard error of *CTE* for a given level of *PTBI* not explained by the model. The RMSE provides an indication of the overall amount of discretion that managers have to report different book income and taxable income.

While a higher RMSE corresponds to lower book–tax conformity and vice versa, we use descending ranks such that the highest RMSE in a given year is ranked zero and the lowest is ranked $n - 1$, where n is the number of countries included in that year. We then divide by $n - 1$ to scale the rankings so that they range between zero and one. This procedure converts the ranks into percentiles, and higher ranks on this measure indicate higher book–tax conformity. We use this ranking because the number of included countries varies by year, as per Atwood et al. (2010), and this transformation gives the book–tax conformity variable a consistent scale across years.

[11] When the current tax expense data is missing, we infer it from total tax expense minus deferred tax expenses when both domestic and foreign data are available. We exclude observations missing current tax expense and for which we have no required data to infer it.

3.2 Measure of book–tax difference

The book–tax difference is the gap between the financial accounting income and taxable income a firm reports. Prior literature computes this gap as the difference between pretax book income and estimated taxable income. Accordingly, we calculate book–tax difference as

$$BTD = PTBI - CTE/STR, \tag{2}$$

where *BTD* is the book–tax difference a firm reports, *STR* is the top statutory corporate tax rate for the home country of the firm, and *PTBI* and *CTE* are defined as in Eq. (1).

Following Hanlon et al. (2012), our tests use the absolute value of *BTD* because both positive and negative book–tax differences indicate the likelihood of earnings management (Hanlon 2005), where negative book–tax differences could stem from managers' deliberate understatement of earnings to take a big bath. Due to data availability, the only way to conduct our test is by using Eq. (2) to estimate book–tax differences. Moreover, the measure of Atwood et al. (2010) is a conceptually superior proxy for book–tax conformity to simply using *BTD*, because, even if countries have the same level of aggregate *BTD*, the extent to which their tax authorities scrutinize financial statements could still differ.[12] Therefore the measure of Atwood et al. (2010) does not merely reflect the effect of *BTD*. In this regard, our study is not just carrying out a cross-country specification of the work of Hanlon et al. (2012).

3.3 Empirical specification

We test our hypotheses with the following regression, where the standard errors of the coefficients are calculated with Newey and West (1987) procedure[13]:

[12] Consider the following example. Countries A and B have three representative firms that report the same taxable incomes (100, 200, 300) and different book incomes that are (100, 200, 300) in country A and (100, 300, 200) in country B. The values of *BTD* are therefore (0, 0, 0) in country A and (0, 100, −100) in country B. The consistent relation between book and taxable incomes in country A suggests that its tax authority will scrutinize financial statements to a larger extent than the tax authority in country B. Note that for both countries the means and medians of aggregate *BTD* are zero, which suggests that using *BTD* cannot distinguish the extent to which tax authorities scrutinize. In contrast, regressing taxable income on book income shows that the RMSE for country A is smaller than that for country B (zero vs. 122.47), which corresponds to the more consistent relation between these two incomes in country A than in country B.

[13] We use Newey and West (1987) procedure because the assumption of time-series independence might be violated in our research setting, given that audit fees and some of our explanatory variables such as *BTC* might be auto-correlated.

$$AUDFEE = \alpha_0 + \alpha_1 BTC + \alpha_2 Ln(BTD) + \alpha_3 BTC \cdot Ln(BTD) + \sum_{k=4}^{15} \alpha_k FSCONTROL + \sum_{l=16}^{18} \alpha_l CLCONTROL + Fixed\ Effects + Error\ Term, \quad (3)$$

where all the variables are defined in Table 1; *FSCONTROL* and *CLCONTROL* denote firm-specific and country-level control variables, respectively; *AUDFEE* is the natural log of audit fees in thousands of U.S. dollars; *BTC* represents the level of book–tax conformity estimated from Eq. (1); *Ln*(*BTD*) is the natural log of the absolute value of book–tax differences estimated from Eq. (2); and *Fixed Effects* represents industry and year fixed effects.

Our main test variables are *BTC* and *BTC*·*Ln*(*BTD*). The coefficient of *BTC* (α_1) captures the impact of book–tax conformity on audit fees. Hypothesis H1 predicts a negative coefficient for *BTC* because increased country-level required book–tax conformity can reduce audit fees. The coefficient of *BTC*·*Ln*(*BTD*) (α_3) captures how firm-level book–tax differences affect the association between audit fees and country-level book–tax conformity. Hypothesis H2 predicts α_3 to be positive because the negative association between audit fees and country-level required book–tax conformity is mitigated among firms with larger book–tax differences.

The inclusion of *Ln*(*BTD*) in Eq. (3) mitigates the concern that the *BTC* measure of Atwood et al. (2010) merely captures the effect of *BTD*, although this concern is conceptually less likely because the *BTC* measure of Atwood et al. captures more effects about book–tax conformity than *BTD* does. Following Hanlon et al. (2012), we include unsigned total accruals (*Ln*(*ACC*)) to control for client complexity and audit risk associated with earnings management, where *Ln*(*ACC*) is the natural log of the absolute value of total accruals in thousands of U.S. dollars.

Following the specification of Choi et al. (2008, 2009), we include the natural log of total assets in thousands of U.S. dollars (*LNTA*) to proxy for client size and the sum of inventories and receivables scaled by total assets (*INVREC*) to proxy for client complexity (Simunic 1980). To further capture client complexity, we include the natural log of one plus the number of business segments (*NBS*), the natural log of one plus the number of geographical segments (*NGS*), and a cross-listing indicator variable (*CROSS*) that equals one when a firm is cross-listed in a foreign country. We include *NBS*, *NGS*, and *CROSS* because operationally or geographically diversified firms and cross-listed firms may need more complex audits. To capture client-specific litigation risk borne by auditors, we include leverage (*LEV*) measured as total liabilities over total assets and a loss indicator variable (*LOSS*) that equals one when a firm reports a net loss. We include a security issuing indicator variable (*ISSUE*) that equals one when a firm issues bonds or new shares, because both the demand for quality audit and audit risk are higher when firms are involved in equity or bond offerings. To capture the fee premiums for using big accounting firms, we include an indicator variable (*BIG-N*) that equals one when a firm uses one of the Big 4 (5, 6, or 8) auditors. Firm profitability (*ROA*) and auditor opinion (*OPINION*) are included to proxy for client financial distress, where *ROA* is

Table 1 Empirical definitions of variables

Variable		Empirical definition	Data source
Dependent variable and test variables for firm *i* in country *j* in year *t*			
$AUDFEE_{ijt}$	=	natural log of audit fees in thousands of U.S. dollars	Worldscope
BTC_{jt}	=	scaled ranking of the RMSEs obtained from country-year estimates of Eq. (1), where the scaled ranking value ranges between 0 and 1 and a higher value corresponds to higher book–tax conformity	Worldscope
$Ln(BTD)_{ijt}$	=	natural log of the absolute value of the spread between pre-tax book income and estimated taxable income, where both incomes are in thousands of U.S. dollars	Worldscope[1]
Firm-specific control variables (*FSCONTROL*) for firm *i* in country *j* in year *t*			
$Ln(ACC)_{ijt}$	=	natural log of the absolute value of total accruals in thousands of U.S. dollars, where total accruals are measured as the differences between earnings and cash flow from operations	Worldscope
$LNTA_{ijt}$	=	natural log of year-end total assets in thousands of U.S. dollars	Worldscope
$INVREC_{ijt}$	=	sum of inventories and receivables scaled by total assets	Worldscope
$LOSS_{ijt}$	=	1 when a firm reports a net loss and 0 otherwise	Worldscope
ROA_{ijt}	=	operating income before depreciation divided by total assets	Worldscope
LEV_{ijt}	=	ratio of year-end total liabilities to total assets	Worldscope
$ISSUE_{ijt}$	=	1 when a firm has obtained long-term debt or equity financing by issuing bonds or new shares to outside capital suppliers in year *t* and 0 otherwise	Worldscope
$CROSS_{ijt}$	=	1 when a firm is cross-listed in a foreign country and 0 otherwise	Worldscope
NBS_{ijt}	=	natural log of 1 plus the number of business segments	Worldscope
NGS_{ijt}	=	natural log of 1 plus the number of geographical segments	Worldscope
$BIG\text{-}N_{ijt}$	=	1 when a firm uses one of the Big 4 (5, 6, or 8) auditors and 0 otherwise	Worldscope
$OPINION_{ijt}$	=	1 when the firm does not receive a standard unqualified audit opinion and 0 otherwise	Worldscope
Country-level control variables (*CLCONTROL*) for country *j* in year *t*			
$DISCL_j$	=	country's required disclosure level measured by the CIFAR index	CIFAR
GDP_{jt}	=	natural log of the gross domestic product per capita in thousands of U.S. dollars	World Bank Statistics
FDI_{jt}	=	foreign direct investment scaled by gross domestic product	World Bank Statistics

[1] The calculation of *Ln*(*BTD*) requires the statutory corporate tax rates for each country. We follow Atwood et al. (2012) by manually collecting these statutory tax rates from a KPMG online summary, PricewaterhouseCoopers's online information, Coopers & Lybrand's worldwide tax summary guides, and the website of the Organisation for Economic Co-operation and Development

operating income before depreciation divided by total assets and *OPINION* is a dummy variable that equals one when the firm does not receive a standard unqualified audit opinion.

We include three country-level control variables that may affect cross-country variations in audit fees: *DISCL* represents a country's required disclosure level developed by the Center for International Financial Analysis and Research (CIFAR)

and a higher level of disclosure requirement may induce more audit work; *GDP* is the natural log of the gross domestic product per capita in thousands of U.S. dollars, included here because audit fees are likely to differ between rich and poor countries; and *FDI* is the level of foreign direct investments, defined as foreign direct investment scaled by gross domestic product, included because the demand for audit services is likely to differ in countries with more foreign direct investments.

3.4 Sample selection

We retrieve all required financial information and audit fee data from the Worldscope database. Our sampling period begins in 1996 and ends in 2012. We start in 1996 because audit fee data prior to 1996 are available only for a few firms (Choi et al. 2008, 2009). The calculation of book–tax differences requires statutory corporate tax rates for each country, and we follow Atwood et al. (2012) by hand-collecting tax rates from KPMG's online summary, PricewaterhouseCoopers' online information, Coopers & Lybrand's worldwide tax summary guides, and the website of the Organisation for Economic Co-operation and Development. These statutory corporate tax rates include both the federal income tax rate and the average effects of state, provincial, and other local government income tax rates. We extract data on the gross domestic product per capita and foreign direct investments from statistics disclosed by the World Bank. Each country's required disclosure level is extracted from the CIFAR index.

Our initial sample consists of all firms from countries for which required data on calculating *BTC* are available. We follow Atwood et al. (2012) in deleting all firm-year observations for countries that do not have at least 20 firms with available data to estimate Eq. (1) in the year. This data availability criterion is less stringent than that of Atwood et al. (2010), but it allows our sample to include more countries and thus generate more variations in book–tax conformity. Our conclusions are unchanged if we follow the more stringent data criterion of Atwood et al. (2010). We further exclude country-year with unavailable statutory tax rates or countries without *DISCL* data. We delete observations with book values of total assets less than US$1 million.[14] After further imposing the data requirement for computing firm-specific variables included in Eq. (3), we obtain a sample of 136,209 firm-year observations from 34 countries.

The number of firm-year observations for each country is shown in Table 2, which ranges from 44 for Greece[15] to 48,809 for the United States.[16] The

[14] We delete observations with book values of total assets less than US$1 million because small firms are usually in the incorporation stage and behave unlike ordinary firms. In addition, several of our control variables are scaled by total assets, and small total assets lead to extreme values.

[15] Several countries (e.g., Greece, Brazil, and Chile) have only a small number of observations. This is due to large omissions of audit fee information in these countries, which significantly reduces their usable observations when estimating Eq. (3). Because they initially have sufficient data to estimate *BTC*, we include them in our sample to avoid selection bias.

[16] The large number of U.S. observations reflects the effect of Final Rule S7-13-00, Revision of the Commission's Auditor Independence Requirements, which requires all U.S. Securities and Exchange Commission registrants to disclose in their proxy statements the amount of audit fees paid.

Table 2 Sample characteristics

Country	*Obs.*	*AUDFEE*	*BTC*	*Ln(BTD)*	*Ln(ACC)*	*LNTA*	*INVREC*	*LOSS*	*ROA*	*LEV*	*ISSUE*	*CROSS*
Australia	8608	4.621	0.063	8.041	7.918	10.692	0.158	0.546	−0.071	0.169	0.796	0.730
Austria	186	6.462	0.949	10.076	10.917	14.015	0.276	0.210	0.104	0.307	0.726	0.145
Belgium	395	6.154	0.511	9.792	10.381	13.629	0.326	0.149	0.104	0.251	0.719	0.084
Brazil	72	6.338	0.545	11.327	11.660	15.086	0.253	0.083	0.127	0.272	0.958	0.056
Canada	4268	6.086	0.157	9.561	9.634	12.560	0.165	0.424	0.008	0.214	0.874	0.259
Chile	71	9.499	0.718	14.189	14.676	17.624	0.172	0.070	0.150	0.258	0.958	0.986
Denmark	1092	6.025	0.518	8.805	9.493	12.637	0.362	0.208	0.096	0.269	0.646	0.070
Finland	667	6.711	0.801	9.932	10.444	13.658	0.321	0.235	0.100	0.250	0.810	0.118
France	2525	7.041	0.362	9.768	10.528	13.775	0.338	0.211	0.077	0.262	0.896	0.171
Germany	7565	7.565	0.331	11.101	11.683	14.831	0.287	0.173	0.105	0.234	0.835	0.477
Greece	44	6.193	0.927	10.044	10.592	13.719	0.300	0.523	0.060	0.300	0.864	0.159
Hong Kong	13,655	5.257	0.287	9.146	9.390	12.340	0.280	0.266	0.035	0.235	0.763	0.048
Ireland	515	5.955	0.798	9.648	9.599	12.752	0.184	0.332	0.076	0.244	0.837	0.691
Israel	221	6.212	0.690	9.472	10.072	13.110	0.260	0.204	0.070	0.318	0.860	0.290
Italy	1255	7.183	0.580	10.946	11.339	14.499	0.323	0.314	0.067	0.302	0.742	0.288
Japan	9542	6.247	0.374	9.263	10.424	13.735	0.332	0.154	0.091	0.205	0.718	0.057
Korea	706	4.344	0.624	8.475	9.063	12.303	0.323	0.283	0.066	0.242	0.751	0.003
Malaysia	7363	3.751	0.745	7.759	8.328	11.588	0.335	0.234	0.068	0.233	0.618	0.125
Mexico	79	8.503	0.627	12.343	13.007	16.170	0.204	0.139	0.136	0.265	0.873	0.608
Netherlands	364	7.709	0.523	10.944	11.391	14.569	0.300	0.228	0.104	0.239	0.843	0.250
New Zealand	844	5.021	0.662	8.532	9.016	12.752	0.180	0.111	0.100	0.224	0.703	0.295
Norway	1030	6.242	0.103	10.253	10.408	13.403	0.208	0.305	0.075	0.339	0.840	0.128
Pakistan	887	3.037	0.354	8.488	8.983	12.009	0.316	0.163	0.160	0.268	0.445	0.016
Philippines	268	3.659	0.501	7.989	8.615	11.876	0.244	0.205	0.082	0.203	0.567	0.075

Table 2 continued

Country	*Obs.*	*AUDFEE*	*BTC*	*Ln(BTD)*	*Ln(ACC)*	*LNTA*	*INVREC*	*LOSS*	*ROA*	*LEV*	*ISSUE*	*CROSS*
Portugal	150	6.619	0.994	10.288	11.149	14.343	0.228	0.147	0.080	0.409	0.907	0.113
Singapore	4809	4.806	0.410	8.635	9.143	12.182	0.325	0.199	0.069	0.230	0.734	0.114
South Africa	1998	6.207	0.171	9.550	9.789	12.883	0.291	0.171	0.117	0.198	0.814	0.215
Spain	330	7.030	0.791	10.842	11.627	14.796	0.319	0.167	0.095	0.335	0.842	0.227
Sweden	2295	6.767	0.232	10.156	10.462	13.617	0.292	0.215	0.079	0.237	0.765	0.242
Switzerland	1414	7.275	0.803	10.494	10.864	14.158	0.310	0.158	0.102	0.210	0.818	0.278
Thailand	51	4.795	0.389	8.098	9.025	11.532	0.322	0.098	0.139	0.396	0.412	0.039
Turkey	54	4.811	0.680	8.317	8.816	11.836	0.434	0.278	0.066	0.158	0.537	0.056
United Kingdom	14,077	5.642	0.113	8.345	8.663	11.681	0.275	0.352	0.033	0.186	0.757	0.058
United States	48,809	6.696	0.034	9.801	10.000	12.844	0.237	0.339	−0.002	0.260	0.878	0.392
Mean (total)	136,209	6.206	0.216	9.508	9.858	12.861	0.258	0.300	0.027	0.235	0.804	0.273
High BTC (>0.3)	40,708	5.677	0.531	9.254	9.891	13.066	0.311	0.212	0.077	0.235	0.739	0.161
Low BTC (≤0.3)	95,501	6.183	0.088	9.386	9.606	12.523	0.243	0.337	0.013	0.234	0.830	0.320
t value for differences		−44.030	569.896	−9.371	19.194	37.292	56.715	−46.375	28.819	0.402	−38.971	−61.146

Country	*NBS*	*NGS*	*BIG-N*	*OPINION*	*GDP*	*FDI*	*DISCL*
Australia	1.260	0.909	0.537	0.150	10.609	0.030	80
Austria	1.423	1.620	0.715	0.016	10.745	0.019	62
Belgium	1.469	1.319	0.765	0.041	10.674	0.183	68
Brazil	1.584	0.990	0.972	0.000	9.162	0.026	56
Canada	1.229	1.082	0.840	0.050	10.662	0.032	75
Chile	1.793	1.290	1.000	0.000	8.968	0.068	78
Denmark	1.516	1.282	0.952	0.015	10.720	0.027	75
Finland	1.614	1.580	0.979	0.015	10.690	0.025	83

Table 2 continued

Country	*NBS*	*NGS*	*BIG-N*	*OPINION*	*GDP*	*FDI*	*DISCL*
France	1.440	1.370	0.681	0.016	10.567	0.023	78
Germany	1.551	1.474	0.820	0.013	10.553	0.012	67
Greece	1.360	1.284	0.773	0.000	10.143	0.006	61
Hong Kong	1.638	1.170	0.669	0.053	10.276	0.224	73
Ireland	1.361	1.217	0.905	0.074	10.619	0.146	81
Israel	1.279	1.206	0.783	0.009	10.106	0.050	74
Italy	1.622	1.396	0.901	0.054	10.431	0.008	66
Japan	1.659	1.105	0.819	0.012	10.624	0.002	71
Korea	1.378	1.098	0.652	0.003	10.019	0.004	68
Malaysia	1.737	0.962	0.572	0.027	8.700	0.031	79
Mexico	1.766	1.446	0.937	0.000	9.022	0.023	71
Netherlands	1.602	1.548	0.920	0.016	10.751	0.027	74
New Zealand	1.211	0.925	0.943	0.009	10.029	0.024	80
Norway	1.342	1.357	0.916	0.014	11.141	0.030	75
Pakistan	1.169	0.723	0.802	0.016	6.614	0.015	73
Philippines	1.400	0.792	0.817	0.078	7.618	0.011	64
Portugal	1.736	1.399	0.913	0.047	9.959	0.033	56
Singapore	1.599	1.333	0.784	0.053	10.354	0.173	79
South Africa	1.508	1.066	0.815	0.021	8.569	0.016	79
Spain	1.775	1.420	0.873	0.015	10.332	0.032	72
Sweden	1.493	1.515	0.983	0.014	10.659	0.048	83
Switzerland	1.581	1.505	0.954	0.011	11.019	0.047	80
Thailand	1.283	0.822	0.627	0.176	8.270	0.030	66
Turkey	1.333	0.719	0.222	0.019	9.098	0.024	58

Table 2 continued

Country	*NBS*	*NGS*	*BIG-N*	*OPINION*	*GDP*	*FDI*	*DISCL*
United Kingdom	1.333	1.115	0.615	0.040	10.446	0.048	85
United States	1.366	1.117	0.704	0.078	10.682	0.016	76
Mean (*total*)	1.438	1.162	0.714	0.058	10.524	0.050	75.838
High BTC (*>0.3*)	1.604	1.209	0.762	0.028	10.081	0.057	74.053
Low BTC (*≤0.3*)	1.386	1.123	0.696	0.068	10.544	0.045	77.235
t value for differences	89.521	31.120	24.783	−29.996	−128.791	25.031	−120.743

The definitions of the variables are shown in Table 1

considerable variation in the number of observations per country raises the concern that our results might be unduly influenced by countries with extreme numbers of observations. To mitigate this concern, we follow Atwood et al. (2012) by calculating the country-year-industry median for each variable and entering the resulting median value into Eq. (3) to repeat our test. This procedure results in a sample of 13,197 country-year-industry observations. While this procedure reduces the influence of any particular country on our results, it also removes much of the variation in the dependent variable and firm-specific control variables. Therefore we draw our main inferences from the results estimated with the full sample and consider the results estimated with the country-year-industry sample as supplementary.

4 Empirical results

4.1 Descriptive statistics

Table 2 presents the means of all the variables included in Eq. (3) for each sample country, as well as their grand means. To obtain an initial sense regarding the effect of *BTC*, we partition our sample countries into high- and low-*BTC* groups, with *BTC* greater than 0.3 as a cutoff point, where this cutoff balances the numbers of observations and countries. The partitioned results are shown in the bottom of Table 2.

Some results of Table 2 are noteworthy. First, audit fees (*AUDFEE*) are, on average, significantly lower in the high-*BTC* subsample than in the low-*BTC* subsample (t value $= -44.030$). This result provides preliminary evidence supporting H1, that higher book–tax conformity is associated with lower audit fees. Moreover, *Ln*(*BTD*) is significantly lower (t value $= -9.371$) in the high-*BTC* than in the low-*BTC* subsample, which may arise because higher country-level required book–tax conformity provides firms with fewer opportunities to generate book–tax differences. The high-*BTC* subsample also presents significantly lower *GDP* and *DISCL* values and higher *FDI* values (t values $= -128.791$, -120.743, and 25.031, respectively), and these results suggest that countries with higher book–tax conformity have less developed economies, lower levels of required disclosure, and larger foreign investments. Hence it is necessary to control for these macroeconomic factors to avoid *BTC* reflecting their effects.

Table 3 presents the Pearson correlations (below the diagonal) and Spearman correlations (above the diagonal) among the variables included in Eq. (3). All reported correlations are statistically significant at the 1 % level, with the exception of those in bold. For both Pearson and Spearman correlations, *AUDFEE* is negatively associated with *BTC*, consistent with H1. Moreover, *Ln*(*BTD*), *DISCL*, and *GDP* are negatively associated with *BTC*, while *FDI* is positively associated with *BTC*. These results are consistent with the comparison of the high- and low-*BTC* subsamples in Table 2. All the correlations between the control variables are no greater than 0.7, except for the correlations between *Ln*(*BTD*), *Ln*(*ACC*), and

Table 3 Correlation matrix

Variable	*AUDFEE*	*BTC*	*Ln(BTD)*	*Ln(ACC)*	*LNTA*	*INVREC*	*LOSS*	*ROA*	*LEV*	*ISSUE*
AUDFEE		−0.176	0.693	0.738	0.807	0.051	−0.256	0.335	0.233	0.257
BTC	−0.185		−0.065	**0.003**	0.054	0.173	−0.131	0.017	0.053	−0.122
Ln(BTD)	0.681	−0.066		0.780	0.775	−0.137	−0.088	0.189	0.259	0.234
Ln(ACC)	0.724	−0.001	0.780		0.861	−0.036	−0.231	0.297	0.313	0.216
LNTA	0.789	0.055	0.775	0.858		−0.020	−0.398	0.364	0.315	0.232
INVREC	−0.008	0.149	−0.173	−0.071	−0.061		−0.203	0.231	0.028	−0.067
LOSS	−0.240	−0.124	−0.079	−0.228	−0.400	−0.171		−0.629	−0.027	−0.008
ROA	0.185	0.080	0.074	0.179	0.324	0.105	−0.384		0.024	0.027
LEV	0.038	**−0.003**	0.078	0.082	0.022	−0.007	0.078	−0.198		0.217
ISSUE	0.244	−0.122	0.235	0.215	0.226	−0.081	−0.008	−0.014	0.063	
CROSS	0.265	−0.182	0.271	0.221	0.229	−0.166	**0.001**	0.024	−0.021	0.099
NBS	0.223	0.235	0.180	0.249	0.317	0.198	−0.222	0.143	−0.008	0.034
NGS	0.400	0.065	0.285	0.304	0.349	0.175	−0.131	0.130	−0.027	0.103
BIG-N	0.419	0.054	0.378	0.422	0.509	−0.019	−0.263	0.208	−0.027	0.105
OPINION	−0.155	−0.084	−0.094	−0.153	−0.251	−0.063	0.222	−0.274	0.142	**−0.004**
DISCL	−0.176	−0.185	−0.212	−0.244	−0.260	−0.041	0.092	−0.040	−0.031	−0.020
GDP	0.343	−0.457	0.174	0.144	0.122	−0.101	0.065	−0.052	**0.004**	0.131
FDI	−0.160	0.129	−0.053	−0.066	−0.068	0.033	−0.038	0.009	**−0.001**	−0.035

Variable	*CROSS*	*NBS*	*NGS*	*BIG-N*	*OPINION*	*DISCL*	*GDP*	*FDI*
AUDFEE	0.240	0.220	0.399	0.454	−0.170	−0.182	0.346	−0.208
BTC	−0.224	0.237	0.086	0.064	−0.094	−0.199	−0.421	0.092
Ln(BTD)	0.253	0.182	0.275	0.393	−0.103	−0.203	0.194	−0.110
Ln(ACC)	0.207	0.255	0.292	0.436	−0.157	−0.235	0.158	−0.151

Table 3 continued

Variable	*CROSS*	*NBS*	*NGS*	*BIG-N*	*OPINION*	*DISCL*	*GDP*	*FDI*
LNTA	0.216	0.320	0.331	0.518	−0.235	−0.249	0.143	−0.164
INVREC	−0.164	0.236	0.236	0.011	−0.084	−0.070	−0.119	−0.021
LOSS	**0.001**	−0.224	−0.130	−0.263	0.222	0.092	0.067	0.014
ROA	0.051	0.132	0.186	0.282	−0.219	−0.051	0.012	−0.062
LEV	−0.009	0.118	0.056	0.093	0.030	−0.077	−0.012	−0.034
ISSUE	0.099	0.039	0.105	0.105	**−0.004**	−0.016	0.099	−0.017
CROSS		0.010	0.086	0.129	**0.003**	0.042	0.173	−0.070
NBS	**0.004**		0.208	0.149	−0.106	−0.138	−0.180	0.022
NGS	0.085	0.208		0.210	−0.099	−0.084	0.064	−0.001
BIG-N	0.129	0.146	0.210		−0.202	−0.099	0.030	−0.055
OPINION	**0.003**	−0.106	−0.098	−0.202		0.043	0.051	0.024
DISCL	−0.025	−0.138	−0.094	−0.094	0.033		−0.020	0.262
GDP	0.129	−0.133	0.129	0.034	0.044	−0.050		−0.192
FDI	−0.158	0.114	0.032	−0.025	**−0.002**	−0.023	−0.046	

The definitions of the variables are shown in Table 1. Pearson correlations are reported below the diagonal and Spearman correlations are reported above the diagonal. All correlations reported are statistically significant at the 1 % level, with the exception of those in bold

LNTA. Untabulated results show that the variance inflation factors for all the control variables are less than 10, so multicollinearity is not a problem.

Note that *Ln*(*BTD*) is highly correlated with *Ln*(*ACC*), which may arise because earnings management via accruals could give rise to deferred tax expenses (Phillips et al. 2003). The high correlation between *Ln*(*BTD*) and *LNTA* suggests that our book–tax difference measure could reflect the effect of firm size. As a robustness test, we estimate Eq. (3) by including the interaction between *Ln*(*BTD*) and *LNTA*, and we find that our conclusions are unchanged.

4.2 Main regression results

The results of estimating Eq. (3) are shown in Table 4. We estimate the regression with our full sample in Panel A and the country-year-industry sample in Panel B.

In Columns (1) and (4) of Table 4, we test the main effect of *BTC* on audit fees. The results show that the coefficient of *BTC* is negative and statistically significant at the 1 % level in both columns, consistent with H1. In Columns (2) and (5), we include *Ln*(*BTD*), and the results show that the coefficient of *BTC* remains negative and statistically significant at the 1 % level. The statistical significance of *BTC* after including *Ln*(*BTD*) mitigates the concern that *BTC* merely captures the effect of firm-level book–tax differences. In addition, the coefficient of *Ln*(*BTD*) is positive and statistically significant at the 1 % level. This result suggests that the positive impact of book–tax differences on audit fees holds not only in the United States but also in other countries. This result extends the work of Hanlon et al. (2012) to an international context.

In Columns (3) and (6) of Table 4, we test our full specification of Eq. (3), and the results show that the coefficient of *BTC*·*Ln*(*BTD*) is positive and significant at the 1 % level, consistent with H2, that the negative association between country-level required book–tax conformity and audit fees is mitigated among firms with larger book–tax differences. Moreover, the coefficient of *BTC* remains significantly negative, while the coefficient of *Ln*(*BTD*) remains significantly positive.

Overall, the results in Table 4 suggest that country-level required book–tax conformity is a significant determinant of audit fees and higher book–tax conformity leads to lower audit fees. With respect to the coefficients of the firm-specific control variables, Table 4 shows that audit fees are associated with client size (*LNTA*), client complexity (*Ln*(*ACC*), *INVREC*, *CROSS*, *NBS*, and *NGS*), client-specific risk (*LOSS* and *LEV*), financial transactions (*ISSUE*), financial distress (*ROA* and *OPINION*), and auditor quality (*BIG4*). These findings are consistent with previous audit fee studies (e.g., Simunic 1980). Moreover, the coefficients of the country-level control variables (*DISCL*, *GDP*, *FDI*) are significant in all cases, consistent with the results of Choi et al. (2008, 2009).

We use the results in Column (3) of Table 4 to assess the economic significance of increased book–tax conformity, because these results are estimated with our full regression specification and full sample. Specifically, we evaluate the regression results in Column (3) at the mean value for each variable (ignoring year and industry effects). We find that a 10 % increase in *BTC* explains about a $12,862

Table 4 Regression Results of Estimating Eq. (3) (with dependent variable *AUDFEE* and *t* values in parentheses)

Variable	Panel A: *Full sample*			Panel B: *Country–year–industry sample*		
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	−7.4813	−7.5034	−7.2344	−7.6229	−7.6108	−7.1872
	(−34.99)**	(−35.69)**	(−33.84)**	(−29.64)**	(−29.92)**	(−26.34)**
BTC	**−1.1214**	**−1.0942**	**−1.7984**	**−0.5906**	**−0.5684**	**−1.4855**
	(−71.66)**	**(−69.92)****	**(−36.08)****	**(−13.07)****	**(−12.64)****	**(−9.43)****
Ln(BTD)		0.0530	0.0351		0.0665	0.0232
		(19.74)**	(11.94)**		(7.64)**	(2.17)*
BTC·Ln(BTD)			**0.0450**			**0.0985**
			(17.13)**			**(6.09)****
Ln(ACC)	0.0593	0.0446	0.0753	0.1022	0.0847	0.0841
	(22.16)**	(17.00)**	(14.55)**	(10.44)**	(8.61)**	(8.56)**
LNTA	0.5447	0.5133	0.5142	0.5307	0.4905	0.4931
	(146.23)**	(120.67)**	(120.66)**	(46.86)**	(39.65)**	(39.83)**
INVREC	0.5040	0.5378	0.5367	0.7193	0.7650	0.7651
	(27.20)**	(29.31)**	(29.22)**	(13.98)**	(14.92)**	(15.00)**
LOSS	0.1811	0.1340	0.1313	0.1940	0.1400	0.1368
	(20.15)**	(14.84)**	(14.54)**	(6.25)**	(4.48)**	(4.38)**
ROA	−0.2016	−0.1717	−0.1742	0.3209	0.3350	0.3402
	(−7.70)**	(−7.43)**	(−7.47)**	(2.14)*	(2.29)*	(2.34)*
LEV	0.0518	0.0497	0.0505	−0.2534	−0.2429	−0.2328
	(5.74)**	(5.72)**	(5.77)**	(−3.33)**	(−3.27)**	(−3.15)**
ISSUE	0.0889	0.0849	0.0830	0.1360	0.1302	0.1266
	(11.15)**	(10.67)**	(10.43)**	(4.71)**	(4.50)**	(4.38)**

Table 4 continued

Variable	Panel A: *Full sample*			Panel B: *Country–year–industry sample*		
	(1)	(2)	(3)	(4)	(5)	(6)
CROSS	0.1865	0.1742	0.1726	0.2221	0.2029	0.1935
	(24.50)**	(22.89)**	(−33.84)**	(7.56)**	(7.00)**	(6.81)**
NBS	0.1210	0.1255	0.1296	0.0165	0.0240	0.0270
	(14.19)**	(14.75)**	(15.22)**	(0.60)	(0.87)	(0.98)
NGS	0.3902	0.3843	0.3821	0.5394	0.5238	0.5149
	(49.35)**	(48.78)**	(48.54)**	(21.82)**	(21.24)**	(20.80)**
BIG-N	0.1446	0.1429	0.1499	0.0677	0.0695	0.0769
	(17.52)**	(17.37)**	(18.23)**	(2.53)*	(2.63)**	(2.92)**
OPINION	0.0969	0.0798	0.0752	0.0694	0.0618	0.0502
	(6.98)**	(5.87)**	(5.53)**	(0.80)	(0.71)	(0.59)
DISCL	0.0097	0.0100	0.0105	0.0124	0.0129	0.0127
	(14.62)**	(15.11)**	(16.06)**	(5.74)**	(6.00)**	(6.04)**
GDP	0.4570	0.4586	0.4436	0.3896	0.3917	0.3888
	(62.29)**	(62.72)**	(59.06)**	(18.06)**	(18.36)**	(18.05)**
FDI	−1.9452	−2.0016	−2.0220	−1.5371	−1.6066	−1.6264
	(−52.78)**	(−54.21)**	(−54.45)**	(−9.53)**	(−10.10)**	(−10.29)**
Obs.	136,209	136,209	136,209	13,197	13,197	13,197
Adjusted R^2	0.7554	0.7566	0.7571	0.7592	0.7607	0.7618

The definitions of the variables are shown in Table 1. Panel A presents the estimation results for the full sample, while Panel B presents the estimation results for the country–year–industry sample. The *t*-statistics are reported in parentheses. Year and industry dummies are included but the results are not presented. The standard errors of the coefficients are calculated with the procedure of Newey and West (1987). The superscripts ** and * indicate statistical significance at the 1 and 5 % levels (two tailed), respectively

reduction[17] in audit fees.[18] Compared with the unlogged grand mean of audit fees $495,714, a $12,862 reduction indicates that a 10 % increase in *BTC*, on average, decreases mean audit fees by 2.6 %. Therefore increased book–tax conformity leads to an economically significant reduction in audit fees. Moreover, a 10 % increase in *Ln*(*BTD*) explains about a $2755 increase in audit fees, which implies that the audit fee premium of the per-dollar book–tax difference is about $0.002.[19] Compared to the $0.0023 inferred by Hanlon et al. (2012),[20] our result seems to suggest that the audit fee premium for book–tax differences is lower in non-U.S. countries.

4.3 Effect of increased book–tax conformity on reducing audit effort

Hypothesis H1 argues that book–tax conformity can reduce audit effort by simplifying tax accruals. To confirm our argument, we regress the absolute value of deferred tax expenses scaled by total assets on *BTC*. We find that the coefficient of *BTC* is negative and significant at the 1 % level. The coefficient of *BTC* remains significantly negative after considering other determinants of deferred tax expenses such as firm size (*LNTA*), capital intensity (gross property, plant, and equipment scaled by total assets), inventory intensity (inventory scaled by total assets), and the absolute value of total accruals scaled by total assets. These results support our argument that book–tax conformity can simplify tax accruals by reducing deferred tax expenses and thereby save audit effort.

As an alternative analysis, we test whether increased book–tax conformity mitigates the effects of tax complexity factors on audit pricing. Prior studies (Mills et al. 1998; Omer et al. 2006) suggest that firms with higher capital intensity, higher inventory intensity, and larger number of business segments (*NBS*) are subject to greater tax complexity.[21] They also find that tax complexity affects audit pricing. In

[17] We first multiply the coefficients (excluding year and industry effects) from Column (3) of Table 4 with the grand mean values of the corresponding variables as reported in Table 2. The sum of these numbers equals logged audit fees (*AUDFEE*) of 6.3295, which implies an unlogged audit fee of 6.3295 × $1000 = $560,876. Next, we recalculate the sum by setting *BTC* to 0.2376, where 0.2376 represents a 10 % increase in *BTC*'s grand mean of 0.216, and keeping the same mean values for the other variables. Thus the new sum equals 6.3063, and the unlogged audit fees change to $548,014. Therefore the difference is $560,876 − $548,014 = $12,862.

[18] Evaluating the regression results of Column (6) of Table 4 for the country-year-industry sample shows that a 10 % increase in *BTC* explains about a $7482 reduction in audit fees. Although such a reduction in audit fees is smaller than for the case of Column (3), its effect is still pronounced enough, especially given that the use of the country–year–industry sample removes much of the variation in our regression variables and thus generates a very conservative result.

[19] The full-sample mean of *Ln*(*BTD*) is 9.508, which is equivalent to an absolute *BTD* of $13,467,033. Thus a 10 % increase is approximately $1.347 million, which implies that the audit fee premium of the per-dollar book–tax difference is about $2755/($13,467,033 × 0.1) = $0.002.

[20] Hanlon et al. (2012) report that a 10 % increase in their mean of absolute book–tax differences leads to a $4600 increase in audit fees. Combined with their unlogged mean value of book–tax differences, $19,945,429, the audit fee premium of the per-dollar book–tax difference is $4600/($19,945,429 × 0.1) = $0.0023.

[21] Tax complexity represents the complexity in complying with the regulations for preparing tax returns. For example, to determine tax depreciation and the cost of goods sold, firms may need to keep additional records for both depreciable assets and inventories for tax purposes. Increased book–tax conformity can reduce the volume and complication of these records. Furthermore, firms with more business segments

this regard, we repeat Eq. (3) by including these factors and their interactions with *BTC*. We find that the coefficients of their interaction terms are all significantly negative. This finding suggests that increased book–tax conformity can simplify tax complexity and thereby mitigate the effects of tax complexity factors on audit pricing. Hence book–tax conformity can save audit effort through reducing tax complexity.

4.4 Effect of increased book–tax conformity on reducing audit risk

Hypothesis H1 argues that increased book–tax conformity reduces audit risk because it deters managers from manipulating financial reporting. To confirm this argument, we examine whether increased book–tax conformity is negatively associated with the likelihood of financial restatements. Prior literature suggests that the managerial manipulation of financial reporting is a driver of restatements (Callan et al. 2008; Choi et al. 2010; Ettredge et al. 2010). If increased book–tax conformity can deter manipulation, we expect higher book–tax conformity to be associated with a lower likelihood of restatements. Because restatements represent audit failures (Raghunandan et al. 2003; Liu et al. 2009), finding results consistent with our expectation suggests that increased book–tax conformity can reduce the likelihood of audit failure and thereby reduce audit risk.

To test our expectation, we use a logistic model that regresses the binary variable *REST* on *BTC*, where *REST* is set to one for firm-year observations with restatements in year $t + 1$ and zero otherwise.[22] Collected from the Worldscope database, our restatement sample begins in 2002 because restatement data prior to 2002 are unavailable for most of our sample countries. Beginning in 2002 reduces our sample size to 105,253. We exclude restatements that are technical and thus unrelated to audit risk.[23] Referring to prior studies (Romanus et al. 2008; Blankley et al. 2012), our logistic regression includes the following determinants of restatements: firm size (*LNTA*), leverage (*LEV*), a loss indicator variable (*LOSS*), a security issuing indicator variable (*ISSUE*), the market-to-book ratio (*MTB*), and year fixed effects.

To support our argument, we expect the coefficient of *BTC* in this logistic regression to be negative. The results of our logistic regression are presented in Table 5.

Column (1) of Table 5 shows that the coefficient of *BTC* is negative and significant at the 1 % level, consistent with our expectation. In Column (2), we further include *Ln*(*BTD*) and find that the coefficient of *BTC* remains significantly

Footnote 21 continued
are likely to have more complex tax returns and increased book–tax conformity can reduce this complexity.

[22] We measure *REST* with restatements in year $t + 1$ because restatements in the future (year $t + 1$) reflect the correction of financial reporting problems in the current period (year t), where t is the year when *BTC* is measured. If a higher level of book–tax conformity can reduce manipulation in the current period, it should be associated with a lower likelihood of future restatements.

[23] In this regard, we exclude restatement events due to discontinued operations, spin-offs, acquisitions, mergers, the adoption of new GAAP, or change in accounting policies.

Table 5 Results of logistic regression: effect of book–tax conformity on restatements (dependent variable *REST*)

Variable	*Full sample*			*High EM*
	(1)	(2)	(3)	(4)
Intercept	−2.899	−2.831	−2.689	−1.979
	(−44.216)**	(−42.456)**	(−39.538)**	(−7.749)**
BTC	**−0.393**	**−0.360**	**−0.216**	**−1.137**
	(−8.977)**	**(−8.162)****	**(−4.661)****	**(−4.476)****
Ln(BTD)		0.038	0.032	0.028
		(5.364)**	(4.552)**	(1.058)
AUDFEE			0.086	0.031
			(9.743)**	(0.779)
LNTA	0.100	0.068	0.019	−0.003
	(23.133)**	(9.295)**	(2.093)*	(−0.092)
LOSS	0.166	0.118	0.110	0.173
	(7.301)**	(4.833)**	(4.488)**	(1.837)
LEV	0.387	0.033	0.029	−0.099
	(2.240)*	(1.881)	(1.674)	(−1.589)
ISSUE	0.164	0.156	0.148	0.080
	(6.298)**	(6.008)**	(5.680)**	(0.818)
MTB	0.001	0.001	0.001	0.001
	(0.416)	(0.371)	(0.317)	(0.215)
Obs.	105,253	105,253	105,253	7218
Pseudo-R^2	0.098	0.099	0.100	0.103

The dependent variable in this table is *REST*, which is set to one for firm-year observations with restatements in year $t + 1$ and zero otherwise. The term *MTB* is the market-to-book ratio. The definitions of the remaining variables are shown in Table 1. The *z*-statistics are reported in parentheses. Column (4) includes only observations with extreme earnings management (EM), since their restatements are very likely to reflect managerial intentional manipulation. Year dummies are included but the results are not presented. We estimate abnormal accruals (unsigned *ABACC*) with a traditional modified Jones model as a measure of earnings management and classify our restatement sample into deciles of *ABACC* by country-year for each two-digit SIC industry. We define an observation as having extreme earnings management if its *ABACC* is in the top decile of that two-digit SIC industry for the country-year. The superscripts ** and * indicate statistical significance at the 1 and 5 % levels (two tailed), respectively

negative. This finding mitigates the concern that *BTC* captures the effect of firm-level book–tax differences on restatements. The significantly positive coefficient of *Ln*(*BTD*) suggests that firms with larger book–tax differences have a greater likelihood of restatements, consistent with the finding of Ettredge et al. (2008).

Moreover, some studies (Kinney et al. 2004; Stanley and DeZoort 2007) find that audit fees are positively associated with the likelihood of restatements because high fees levels can influence an auditor's independence through economic bonding to the client. This finding raises the concern that the effect of *BTC* on restatements could reflect the effect of audit fees, since Table 4 indicates that *BTC* is associated with audit fees.

To mitigate this concern, Column (3) of Table 5 extends Column (2) by further including audit fees (*AUDFEE*). As shown in Column (3), including *AUDFEE* does not change our conclusion. Moreover, the significantly positive coefficient of *AUDFEE* suggests that the positive association between audit fees and the likelihood of restatements also extends to non-U.S. firms.

We recognize that an alternative interpretation of a negative coefficient for *BTC* in Columns (1) to (3) of Table 5 is that book–tax conformity reduces the complexity in tax expense computation rather than deterring the managerial manipulation of financial reporting. To rule out this interpretation, in Column (4) we repeat our test in Column (3) by using only observations with a high likelihood of extreme earnings management, since restatements of these observations are very likely due to the manipulation of financial reporting and thus better fit our argument. We estimate unsigned abnormal accruals[24] (*ABACC*) as a measure of earnings management and classify our restatement sample into deciles of *ABACC* by country–year for each two-digit Standard Industrial Classification (SIC) industry. We define an observation as having a high likelihood of extreme earnings management if its *ABACC* is in the top decile of that two-digit SIC industry for the country-year.

As shown in Column (4) of Table 5, the coefficient of *BTC* remains significantly negative even when we consider only restatements that are likely due to the manipulation of financial reporting. Overall, the results in Table 5 suggest that higher book–tax conformity is associated with a lower likelihood of restatements. Accordingly, they support our argument in H1 that increased book–tax conformity can reduce audit risk.[25]

[24] We follow the traditional modified Jones model to estimate the abnormal accruals. Specifically, the modified Jones model is estimated cross-sectionally by country–year for each two-digit SIC industry with at least five observations, where the model regresses total accruals on the inverse of beginning assets, the change of sales scaled by beginning assets, and gross property, plant, and equipment scaled by beginning assets. The residuals from the modified Jones model represent abnormal accruals.

[25] A potential concern for the results in Table 5 is that *BTC* captures the effects of other country-level institutions on restatements. To alleviate this concern, we repeat our tests in Table 5 by including additional legal and extra-legal institutional features considered in Table 7. We find that including additional institutional features does not change our conclusions in Table 5.

4.5 Effect of reduced audit effort versus the effect of reduced audit risk on the negative relation between book–tax conformity and audit fees

The results in Sects. 4.3 and 4.4 suggest that increased book–tax conformity can reduce audit effort and audit risk. In this regard, it is interesting to separate the effect of reduced audit effort from that of reduced audit risk and explore which one explains more about how increased book–tax conformity decreases audit fees. To separate these two effects, we partition our full sample into two subsamples based on the level of investor legal protection and repeat Eq. (3) for the high- and low-protection subsamples separately. The reasoning for doing so is as follows.

When investor protection is strong, the effect of tax authorities' scrutiny would be inconspicuous,[26] so *BTC* should primarily reflect the effect of reduced audit effort. In contrast, when investor protection is weak, the effect of tax authorities' scrutiny would be pronounced, and *BTC* should reflect both the effect of reduced audit effort and the effect of reduced audit risk.[27] Hence the coefficient of *BTC* for the high-protection subsample will primarily reflect the effect of reduced audit effort and the difference in the coefficients of *BTC* between the high- and low-protection subsamples will reflect the effect of reduced audit risk.

Referring to Choi and Wong (2007), we measure investor legal protection by using a combined index (*LAW*) that equals the sum of 100 % of the Antidirector Rights Index (*Anti*) plus 50 % of the average of the rule of law index (*Rule*) and the efficiency of the judicial system index (*EFF*).[28] With this construction, *LAW* captures both the quality of legal regulation and the quality of its enforcement, where a larger value of *LAW* represents stronger investor legal protection. We collect *Anti* from Djankov et al. (2008) and *Rule* and *EFF* from La Porta et al. (1998).

We then estimate Eq. (3) by partitioning our full sample into a high-protection ($LAW > 8$) subsample and a low-protection ($LAW \leq 8$) subsample, where eight is the median of *LAW*. The estimated results for the high- and low-protection subsamples are presented in Table 6, Columns (1) and (2), respectively.

As shown in Table 6, the coefficients of *BTC* are negative and significant in both Columns (1) and (2) and this coefficient is significantly smaller for the low-protection subsample than for the high-protection subsample. In this regard, the coefficient of *BTC* for the high-protection subsample (−0.7768) reflects the effect of

[26] This argument is reasonable because strong legal institutions might sufficiently discipline managers, so that the effect of tax authorities' scrutiny on further deterring the managerial manipulation of financial reporting is limited.

[27] This argument presumes that the effect of reduced audit effort is indifferent between high- and low-investor protection countries. Such a presumption is plausible because there is no reason to believe that the effect of increased book–tax conformity on simplifying tax accruals will differ due to the difference in investor legal protection.

[28] We use 100 % of *Anti* and 50 % of the average of *Rule* and *EFF* because *Anti* ranges from zero to five while *Rule* and *EFF* range from zero to 10. The quality of legal institutions depends not only on the contents of regulations but also on the proper enforcement of these regulations. Accordingly, we use *Anti* to measure the legal contents of rights granted by law to protect investors and use *Rule* and *EFF* to measure the quality of legal enforcement.

Table 6 Regression results estimated separately for subsamples of high- or low-investor protection countries (dependent variable *AUDFEE*)

Variable	(1) High protection (*Law* > *8*)		(2) Low protection (*Law* ≤ *8*)	
	Coefficient	t value	Coefficient	t value
Intercept	−8.6989	(−63.09)**	−9.0070	(−49.00)**
BTC	**−0.7768**	**(−12.57)****	**−2.4291**	**(−22.73)****
Ln(BTD)	0.0522	(14.39)**	0.0113	(2.54)*
BTC·Ln(BTD)	**0.0024**	**(0.35)**	**0.1788**	**(17.58)****
Ln(ACC)	0.0475	(16.09)**	0.0656	(15.53)**
LNTA	0.4854	(120.63)**	0.4665	(70.76)**
INVREC	0.5574	(29.25)**	0.8107	(32.43)**
LOSS	0.0922	(9.09)**	0.1192	(8.34)**
ROA	−0.1570	(−5.89)**	−0.1565	(−7.15)**
LEV	0.0479	(6.68)**	0.0131	(1.39)
ISSUE	0.0648	(7.98)**	0.0542	(3.38)**
CROSS	0.1074	(11.15)**	0.1124	(9.69)**
NBS	0.1331	(13.57)**	0.2640	(21.47)**
NGS	0.4839	(57.25)**	0.4771	(42.60)**
BIG-N	0.1714	(20.69)**	0.1903	(11.59)**
OPINION	−0.0039	(−0.25)	0.0609	(3.11)**
DISCL	0.0104	(13.73)**	0.0450	(18.48)**
GDP	0.5521	(63.76)**	0.4771	(46.38)**
FDI	−1.3696	(−36.41)**	−0.7314	(−3.11)**
Obs.	76,732		59,477	
Adjusted R^2	0.7669		0.6906	

The variable *LAW* equals the sum of 100 % of the *Anti* value plus 50 % of the average of the *Rule* and *EFF* values, where *Anti* is the Antidirector Rights Index, *Rule* is the rule of law index, and *EFF* is the efficiency of the judicial system index. We collect *Anti* from Djankov et al. (2008) and *Rule* and *EFF* from La Porta et al. (1998). Countries with a *LAW* index larger than eight (equal to or smaller than eight) are categorized as high investor protection (low investor protection). The definitions of the remaining variables are shown in Table 1. The standard errors of the coefficients are calculated with the procedure of Newey-West (1987). The superscripts ** and * indicate statistical significance at the 1 and 5 % levels (two tailed), respectively

reduced audit effort and the difference in the coefficients of *BTC* between the high- and low-protection subsamples (−1.6523) reflects the effect of reduced audit risk.

Accordingly, it seems that the effect of reduced audit risk due to tax authorities' scrutiny explains more about how book–tax conformity reduces audit fees, while the effect of reduced audit effort due to the simplification in tax accruals explains less.[29]

[29] As an alternative test, we repeat Table 6 by partitioning our sample based on the strength of tax enforcement, proxied by the index of perceived tax compliance (*TAC*) of Dyck and Zingales (2004). Strong tax enforcement implies that tax authorities monitor financial statements to a large extent (Hanlon et al. 2014), so the effect of increased tax authorities' scrutiny due to book–tax conformity will be limited. In this regard, we expect the effect of *BTC* to be less pronounced for the high-enforcement subsample (*TAC* > 4.5). Consistent with our expectation, we find that the coefficient of *BTC* for the high-enforcement subsample is −0.7738 and the difference in the coefficients of *BTC* between the high- and

This result implies that countries with strong investor protection may benefit less from increasing book–tax conformity because tax authorities' scrutiny has a limited effect.

Some results in Table 6 are noteworthy. Specifically, the coefficient of *Ln*(*BTD*) is positive and significant in both subsamples, but the coefficient is larger for the high-protection subsample than for the low-protection subsample. If audit pricing reflects how auditors evaluate risk, then this result suggests that auditors care less about risk embodied in clients' book–tax differences when they work in an environment with low investor protection. In this regard, auditors may fail to serve governance roles when underlying legal systems are weak and cannot discipline them (Francis et al. 2003).

Furthermore, the coefficient of *BTC*·*Ln*(*BTD*) is positive for both subsamples, but it is only significant for the low-protection subsample. This result suggests that when investor legal protection is weak, increased book–tax conformity can play a surrogate role as investor legal protection to force auditors to notice the risk embodied in their clients' book–tax differences. In contrast, in an environment with strong investor legal protection, auditors have been disciplined to pay sufficient attention to the risk embodied in clients' book–tax differences, so the effect of increased book–tax conformity on further disciplining auditors is limited.

4.6 Alternative test for the effect of reduced audit effort versus the effect of reduced audit risk

In this section, we present an alternative test of that in Sect. 4.5. Specifically, we use the time to prepare, file, and pay taxes (*TIME*) as a proxy for the audit effort needed to verify tax expenses and tax accruals. The World Bank provides annual statistics for each country on the number of hours corporations take to prepare, file, and pay taxes.[30] It is likely that a higher *TIME* represents more complications to complete tax returns and such complications imply that auditors have to do more work to check tax expenses or tax deductions underlying tax returns. In this regard, a higher *TIME* will be associated with greater audit effort.[31]

Our test herein involves two stages. In the first, we regress *BTC* on the natural log of *TIME* and country and year fixed effects. With this specification, the regression fitted value (BTC_{Fit}) represents the effect of book–tax conformity concerning audit effort. In the second stage, we repeat Eq. (3) by including BTC_{Fit}, where the inclusion of BTC_{Fit} makes *BTC* capture the effect of book–tax conformity

Footnote 29 continued
low-enforcement subsamples is −1.7820. This result is similar to that in Table 6, which also suggests that the effect of reduced audit risk explains more about how book–tax conformity reduces audit fees.

[30] Preparation time includes the time to collect all the information necessary to compute the tax payable. The filing time includes the time to complete all necessary tax return forms and file the relevant returns. Payment time considers the hours needed to make the payment online or with the tax authorities.

[31] When we repeat Eq. (3) by including the natural log of *TIME*, we find that its coefficient is significantly positive. This finding suggests the feasibility of using *TIME* to capture the effect of audit effort.

concerning audit risk. In this regard, we find that the coefficient of *BTC* is −1.7237, the coefficient of BTC_{Fit} is −0.8012, and both coefficients are significant at the 1 % level. The coefficient of *BTC* is significantly smaller than that of BTC_{Fit} (Wald test p value < 0.01). This result suggests that the effect of book–tax conformity concerning audit risk explains more about how book–tax conformity decreases audit fees, consistent with our conclusion reached in Table 6.

5 Robustness tests and additional analysis

5.1 Robustness tests

We perform several tests to check the robustness of our empirical results. First, we examine whether our results are sensitive to how we calculate *BTC*. To allow more variation in *BTC*, we require only 20 usable observations to estimate *BTC* in each country-year. Here, we follow the more stringent data availability criterion of Atwood et al. (2010) by requiring at least 40 usable observations for each country-year and repeat Eq. (3) with the new *BTC*. We also redefine *BTC* by removing firm-year observations with negative pre-tax book income (i.e., $PTBI < 0$) or those with negative current tax expenses (i.e., $CTE < 0$). We find that defining *BTC* in these ways does not change our conclusions, so our findings are not sensitive to how we calculate *BTC*.

Moreover, our use of unsigned *BTD* implicitly assumes that auditors pay equal attention to positive and negative book–tax differences, which may be inconsistent with the practice that positive book–tax differences are more likely to attract their attention. To address this issue, we divide our sample into two subsamples based on whether *BTD* is positive or negative. We then repeat Eq. (3) for these two subsamples separately and find that our conclusions remain unchanged for both subsamples. Hence our results are robust to the use of unsigned *BTD*.

We also investigate whether our results change if auditors set their fees for the current year based on the previous year's book–tax differences. We estimate Eq. (3) by using a lagged *BTD* to replace the current *BTD* and find that the coefficient of lagged *Ln*(*BTD*) is still significantly positive, which is consistent with lagged book–tax differences influencing current audit fees as well. In addition, the coefficients of *BTC* and *BTC*·lagged *Ln*(*BTD*) are both significant with signs consistent with our hypotheses.

We also consider the industry-adjusted *BTD*.[32] Specifically, a significant portion of book–tax differences may be normal and unrelated to either earnings management or tax aggressiveness, while normal book–tax differences should not induce concerns for auditors. To address this issue, we repeat Eq. (3) with industry-adjusted *BTD* and find that the coefficients of *BTC*, *Ln*(*BTD*), and *BTC*·*Ln*(*BTD*) are all significant, with signs consistent with those in Table 4.

[32] We calculate an industry-adjusted *BTD* by subtracting the raw industry median from the raw value of *BTD* and then taking the natural log of the absolute value of the result, where industries are defined by their two-digit SIC codes.

A potential concern for our findings is that sample concentration in some countries can influence our results. For example, U.S. observations account for about one-third of our full sample, so it is likely that U.S. firms primarily drive our findings. To mitigate this concern, we repeat Eq. (3) by excluding the United States; by further excluding Hong Kong, the United Kingdom, and Japan; or by removing any single country from our sample. We find that none of these changes affects our conclusions.

Finally, we assess whether the *BTC* measure of Atwood et al. (2010) merely captures the effect of *BTD*. In this regard, we find that the correlation between *BTC* and the country–year median *Ln*(*BTD*) is −0.1665, which suggests that the collinearity issue between them is not serious. The low correlation also suggests that *BTC* and *BTD* could capture different effects. As a formal assessment, we create a book–tax conformity measure ($BTC_{Ln(BTD)}$) with a scaled descending ranking of the country–year median *Ln*(*BTD*).[33]

We repeat our tests in Columns (1) to (3) of Table 4 by including $BTC_{Ln(BTD)}$ and find that the coefficient of *BTC* remains significantly negative in any case. This finding suggests that *BTC* has an incremental effect on audit fees that is beyond the effect of $BTC_{Ln(BTD)}$, so it is less likely that *BTC* merely captures the effect of *BTD*.

Moreover, in Sect. 3.2 we argue that *BTC* is a conceptually superior measure of book–tax conformity to *BTD*. To evaluate this argument, we repeat the same tests as in Sects. 4.4 to 4.6 by replacing *BTC* with $BTC_{Ln(BTD)}$, and we find the following results. First, when we repeat Column (4) of Table 5 (Sect. 4.4) by replacing *BTC* with $BTC_{Ln(BTD)}$,[34] we find that $BTC_{Ln(BTD)}$ has no significant effect on the likelihood of restatements. Second, when we repeat Table 6 (Sect. 4.5) by replacing *BTC* with $BTC_{Ln(BTD)}$,[35] we find that the coefficient of $BTC_{Ln(BTD)}$ is not significantly smaller for the low-protection subsample than for the high-protection subsample. Third, when we use $BTC_{Ln(BTD)}$ to conduct the two-stage regression in Sect. 4.6, we find that, in the second-stage regression, the coefficient of the fitted value of $BTC_{Ln(BTD)}$ estimated from the first-stage regression is significantly negative, but the coefficient of $BTC_{Ln(BTD)}$ is insignificant. All these results suggest that *BTC* is a better measure of book–tax conformity than *BTD*.

5.2 Effects of institutional features other than book–tax conformity

In this section, we test whether our findings in Table 4 are robust to the inclusion of other country-level legal and extra-legal institutional variables. Prior literature suggests that country-level legal institutions affect how auditors make decisions

[33] Specifically, the country with the highest median *Ln*(*BTD*) in a given year is ranked zero and the lowest is ranked $n - 1$, where n is the number of countries included in that year and we divide by $n - 1$ to scale the rankings. Given the presumption that *BTD* is lower in countries with higher book-tax conformity, a larger value of $BTC_{Ln(BTD)}$ should imply a higher degree of book-tax conformity.

[34] As in note 25, we include the legal and extra-legal institutional features considered in Table 7 to avoid the concern of other country-level institutions confounding $BTC_{Ln(BTD)}$, since considering these institutional features makes our test here more complete.

[35] We exclude *Ln*(*BTD*) because including it might confound $BTC_{Ln(BTD)}$, given that both are constructed with *BTD*.

(e.g., Choi and Wong 2007; Choi et al. 2008, 2009). In this regard, the tests herein alleviate the concern that book–tax conformity could be associated with other country-level institutions (Leuz et al. 2003), so that our finding about the association between audit fees and *BTC* might spuriously reflect the association between audit fees and other country-level institutions (Srinidhi et al. 2009).

Following Haw et al. (2004), we use the Antidirector Right Index (*Anti*), the rule of law index (*Rule*), and the efficiency of the judicial system index (*EFF*) to proxy for the effects of legal institutions. We also consider the effects of extra-legal institutions by using the perception of tax compliance (*TAC*), product market competition (*COMP*), and the per capita circulation of daily newspapers (*News*). We collect *COMP*, *News*, and *TAC* from Dyck and Zingales (2004).

How stronger legal and extra-legal institutions affect audit fees is unclear ex ante. On the one hand, stronger institutions can discipline managers (Leuz et al. 2003; Dyck and Zingales 2004; Haw et al. 2004) so that auditors lower the risk assessment of client firms. In this regard, stronger institutions could decrease audit fees and the audit fee premiums for book–tax differences. On the other hand, stronger institutions can also discipline auditors (Francis et al. 2003) because the increased monitoring from stronger institutions raises the probability of audit failure being discovered. Stronger institutions could thus increase audit fees and the audit fee premiums for book–tax differences.

The results of considering these additional institutions are presented in Table 7.[36] Panel A shows that the coefficient of *BTC* is negative and significant after considering these institutions. This result suggests that the legal and extra-legal institutions we consider do not confound *BTC*. Hence the negative relation between audit fees and *BTC* found in Table 4 is not driven by these institutions. Panel B presents the estimate results that include these institutional variables and their interactions with *Ln*(*BTD*). Consistent with the results in Table 4, the coefficient of *BTC* remains significantly negative and the coefficient of *BTC*·*Ln*(*BTD*) remains significantly positive.

For the effects of legal and extra-legal institutions on audit fees, Panel A of Table 7 shows that the coefficients of *Anti*, *Rule*, *TAC,* and *News* are negative and those of *EFF* and *COMP* are positive. However, Panel B shows that the coefficients of all these institutions are positive and their interaction terms with *Ln*(*BTD*) are all positive except for *EFF*·*Ln*(*BTD*). These results tend to suggest that stronger institutions increase audit fees and the audit fee premiums of book–tax differences, which is more consistent with the auditor discipline argument than the managerial discipline argument. That is, auditors perceive that stronger institutions raise the probability of audit failure being discovered and this effect dominates the effect that stronger institutions discipline managers and achieve the desired outcomes of auditors.

Note that, in Panel B of Table 7, the significance of the interaction terms of the institutional variables with *Ln*(*BTD*) suggest that both legal and extra-legal

[36] The sample size is slightly reduced from 136,209 to 134,368 because of missing values of *TAC*, *COMP*, and *News* for Belgium, Greece, Ireland, and Pakistan.

institutions affect the association between book–tax differences and audit fees, differentiating our study from that of Hanlon et al. (2012).

Moreover, in both Panels A and B of Table 7, the coefficient of *BTC* is smaller than that reported in Column (3) of Table 4, which suggests that, to some extent, *BTC* might still be affected by other country-level institutions. For another robustness test, we conduct a two-stage test to mitigate this concern. In the first stage, we regress *BTC* on *Anti*, *Rule*, *EFF*, *TAC*, *News*, and *COMP*. In the second stage, we use the residuals estimated from the first stage, denoted $BTC_{residual}$, to replace *BTC* and rerun Eq. (3), where $BTC_{residual}$ represents the residual effect of book–tax conformity after excluding the effects of these institutions.

The estimated results are shown in Table 8, where the results of the first-stage test are shown in Panel A and the results of the second-stage test are shown in Panel B. Panel A shows that all the institutional variables we consider are significantly associated with *BTC*, so the control of their effects is imperative. Panel B shows that the coefficient of $BTC_{residual}$ is significantly negative while the coefficient of $BTC_{residual}$·*Ln*(*BTD*) is significantly positive. Again, these results are consistent with those reported in Table 4. Overall, the results of Tables 7 and 8 reveal that our main empirical findings are robust to the inclusion of legal and extra-legal institutions other than book–tax conformity.

5.3 Tax avoidance versus financial accounting motives

In this section, we evaluate whether the positive coefficient of *BTC*·*Ln*(*BTD*) in Table 4 suggests that H2 is applicable to both firm-level book–tax differences due to earnings management and those due to tax aggressiveness, so that the negative association between audit fees and country-level book–tax conformity is mitigated among firms with greater concerns for both earnings management and tax aggressiveness.

To conduct this test, we refer to Ayers et al. (2010) and Blaylock et al. (2012) by dividing our sample into two subsamples based on whether the book–tax differences are due to earnings management or tax aggressiveness. We then repeat Eq. (3) for these two subsamples separately. If H2 is applicable to both book–tax differences due to earnings management and those due to tax aggressiveness, we expect a positive effect of *BTC*·*Ln*(*BTD*) on audit fees for both subsamples.

We use the tax avoidance measure (*TA*)[37] of Atwood et al. (2012) as a proxy for tax aggressiveness, where a larger *TA* indicates a higher level of tax aggressiveness. As in Sect. 4.4, herein we also use *ABACC* to measure earnings management. We classify our sample into quartiles of *TA* (*ABACC*) by country-year for each two-digit SIC industry and identify an observation as having a high likelihood of tax avoidance (earnings management) if its *TA* (*ABACC*) value is in the top quartile of that two-digit SIC industry for the country-year.

[37] The variable *TA* is calculated as the sum of pre-tax book earnings in years t to $t-2$ multiplied by the corporate statutory tax rates in each corresponding year less the sum of cash taxes actually paid in years t to $t-2$, expressed as a percentage of the sum of pre-tax book earnings from years t to $t-2$. Note that the construction of *TA* considers the differences in corporate tax rates across countries, which makes *TA* comparable across countries.

Table 7 Regression results of estimating Eq. (3) with country-level institutional variables (dependent variable *AUDFEE*)

	Panel A		Panel B	
Variable	Coefficient	t value	Coefficient	t value
Intercept	−11.4401	(−45.20)**	−12.0542	(−25.51)**
BTC	**−0.9513**	**(−18.10)****	**−0.7556**	**(−9.73)****
BTC·Ln(BTD)	**0.0264**	**(8.99)****	**0.1050**	**(2.13)***
Anti	−0.1065	(−12.85)**	0.0299	(3.44)**
Anti·Ln(BTD)			0.0436	(16.83)**
Rule	−0.0989	(−9.02)**	0.5063	(118.50)**
Rule·Ln(BTD)			0.4907	(26.89)**
EFF	0.0943	(5.91)**	0.1278	(14.25)**
EFF·Ln(BTD)			−0.1667	(−7.21)**
TAC	−0.4053	(−27.39)**	0.0461	(5.63)**
TAC·Ln(BTD)			0.0530	(6.68)**
COMP	0.8032	(51.34)**	0.1366	(17.81)**
COMP·(BTD)			0.1899	(21.87)**
News	−0.0822	(−19.94)**	0.3512	(44.55)**
News·Ln(BTD)			0.1860	(22.24)**
Ln(BTD)	0.0509	(9.65)**	0.0753	(5.68)**
Ln(ACC)	0.0444	(17.11)**	0.0405	(38.80)**
LNTA	0.5053	(119.00)**	0.4240	(26.34)**
INVREC	0.4864	(26.66)**	−0.1933	(−3.85)**
LOSS	0.1271	(14.15)**	−0.2953	(−10.30)**
ROA	−0.1667	(−7.17)**	0.0191	(6.35)**
LEV	0.0477	(5.71)**	−0.1766	(−6.23)**
ISSUE	0.0527	(6.62)**	0.0078	(2.62)**
CROSS	0.1380	(18.22)**	0.2845	(6.44)**
NBS	0.1928	(22.12)**	−0.0193	(−4.58)**
NGS	0.3560	(45.23)**	−0.4228	(−9.23)**
BIG-N	0.1879	(22.63)**	0.0025	(0.55)
OPINION	0.0756	(5.70)**	0.8047	(15.14)**
DISCL	0.0395	(38.83)**	−0.0023	(−0.41)
GDP	0.4335	(27.63)**	0.0050	(0.52)
FDI	−0.1708	(−3.42)**	−0.0092	(−9.50)**
Obs.		134,368		134,368
Adjusted R^2		0.7696		0.7702

For legal institutional variables, *Anti* is the Antidirector Rights Index, *Rule* is the rule of law index, and *EFF* is the efficiency of the judicial system index. For extra-legal institutional variables, *TAC* measures the perception of tax compliance, *COMP* measures the level of product market competition, and *News* is the per capita circulation of daily newspapers. We collect the values of *Anti* from Djankov et al. (2008), *Rule* and *EFF* from La Porta et al. (1998), and *COMP*, *News*, and *TAC* from Dyck and Zingales (2004). For the detailed definitions and measures of these variables, please refer to the appendix of Haw et al. (2004). The definitions of the remaining variables are shown in Table 1. Year and industry dummies are included, but the results are not presented. The standard errors of the coefficients are calculated with the procedure of Newey and West (1987). The superscripts ** and * indicate statistical significance at the 1 and 5 % levels (two tailed), respectively

Table 8 Regression results of estimating Eq. (3) by excluding the effects of country-level institutional features from *BTC*

Panel A (Dependent variable = *BTC*)			Panel B (Dependent variable = *AUDFEE*)		
Variable	Coefficient	t value	*Variable*	Coefficient	t value
Intercept	3.3680	(146.77)**	***Intercept***	−10.0347	(−47.57)**
Anti	−0.0685	(−41.72)**	$\boldsymbol{BTC_{residual}}$	**−1.3070**	**(−16.85)****
Rule	−0.0465	(−26.80)**	***Ln*(*BTD*)**	0.0617	(22.50)**
EFF	−0.0249	(−8.71)**	$\boldsymbol{BTC_{residual}}$***·Ln*(*BTD*)**	**0.0698**	**(7.99)****
TAC	0.0281	(9.63)**	***Ln*(*ACC*)**	0.0478	(17.79)**
COMP	−0.4366	(−115.75)**	***LNTA***	0.5065	(116.45)**
News	0.0422	(71.13)**	***INVREC***	0.5090	(27.12)**
			LOSS	0.1266	(13.69)**
			ROA	−0.1678	(−7.34)**
			LEV	0.0493	(5.72)**
			ISSUE	0.1163	(14.27)**
			CROSS	0.2140	(27.10)**
			NBS	0.0770	(8.69)**
			NGS	0.3431	(42.52)**
			BIG-N	0.1132	(13.27)**
			OPINION	0.0938	(6.79)**
			DISCL	0.0153	(22.35)**
			GDP	0.6448	(81.43)**
			FDI	−2.3478	(−59.19)**
Obs.		134,368	***Obs.***		134,368
Adjusted $\boldsymbol{R^2}$		0.5093	***Adjusted*** $\boldsymbol{R^2}$		0.7443

The variable $BTC_{residual}$ is the regression residual from regressing *BTC* on *Anti*, *Rule*, *EFF*, *TAC*, *COMP*, and *News*. The term $BTC_{residual}$ represents the remaining effect after excluding the effects of these legal and extra-legal institutional variables. For the legal institutional variables, *Anti* is the Antidirector Rights Index, *Rule* is the rule of law index, and *EFF* is the efficiency of the judicial system index. For the extra-legal institutional variables, *TAC* measures the perception of tax compliance, *COMP* measures the level of product market competition, and *News* is the per capita circulation of daily newspapers. We collect the values of *Anti* from Djankov et al. (2008), *Rule* and *EFF* from La Porta et al. (1998), and *COMP*, *News*, and *TAC* from Dyck and Zingales (2004). For the detailed definitions and measures of these variables, please refer to the appendix of Haw et al. (2004). The definitions of the remaining variables are shown in Table 1. The standard errors of the coefficients are calculated with the procedure of Newey-West (1987). The superscripts ** and * indicate statistical significance at the 1 and 5 % levels (two tailed), respectively

To avoid confounding tax aggressiveness with earnings management, we exclude observations with both characteristics so that either subsample reflects either the individual effect of earnings management or that of tax aggressiveness. Because we use *ABACC* to measure earnings management, we exclude *Ln*(*ACC*) from our regression to avoid the potential confounding effect between these two measures. The results are reported in Table 9, where Column (1) shows the results estimated for the tax aggressiveness subsample and Column (2) shows the results estimated for the earnings management subsample.

Table 9 Regression results for book–tax difference subsamples related to tax aggressiveness or earnings management (dependent variable *AUDFEE*)

Variable	(1) Tax aggressiveness		(2) Earnings management	
	Coefficient	t Value	Coefficient	t Value
Intercept	−6.4152	(−15.65)**	−7.8540	(−26.40)**
BTC	**−2.0417**	**(−11.06)****	**−1.8917**	**(−12.90)****
Ln(BTD)	0.0485	(4.90)**	0.0326	(4.49)**
BTC·Ln(BTD)	**0.0582**	**(3.34)****	**0.0707**	**(4.69)****
LNTA	0.4919	(31.55)**	0.5168	(66.18)**
INVREC	0.5560	(12.43)**	0.2472	(5.79)**
LOSS	0.1932	(8.22)**	0.1750	(7.08)**
ROA	−0.1678	(−4.04)**	−0.0993	(−4.23)**
LEV	−0.0193	(−1.83)	0.0458	(2.32)*
ISSUE	0.0660	(2.99)**	0.1071	(4.84)**
CROSS	0.2367	(8.72)**	0.3407	(14.49)**
NBS	0.0513	(1.91)	0.0941	(4.12)**
NGS	0.3634	(19.38)**	0.3771	(19.33)**
BIG-N	0.1516	(4.55)**	0.1746	(8.25)**
OPINION	0.3058	(0.88)	0.0590	(1.37)
DISCL	0.0027	(1.43)	0.0130	(6.87)**
GDP	0.4930	(11.98)**	0.0525	(27.93)**
FDI	−2.0198	(−22.21)**	−2.0642	(−21.07)**
Obs.		14,018		13,647
Adjusted R^2		0.6837		0.7456

Column (1) presents the estimation results for the tax aggressiveness subsample and Column (2) presents the estimation results for the earnings management subsample. We use the tax avoidance measure (*TA*) of Atwood et al. (2012) as a proxy for tax aggressiveness, where *TA* is the sum of pre-tax book earnings in years t to $t-2$ multiplied by the corporate statutory tax rates in each year less the sum of taxes actually paid in years t to $t-2$, expressed as a percentage of the sum of pre-tax book earnings from years t to $t-2$. We estimate abnormal accruals (*ABACC*) with the traditional modified Jones model as a measure of earnings management. We classify observations into quartiles of *TA* (unsigned *ABACC*) by country-year for each two-digit SIC industry, and identify an observation as having a high likelihood of tax avoidance (earnings management) if its *TA* (unsigned *ABACC*) value is in the top quartile of that two-digit SIC industry for the country-year. The definitions of all the variables are shown in Table 1. The standard errors of the coefficients are calculated with the procedure of Newey-West (1987). The superscripts ** and * indicate statistical significance at the 1 and 5 % levels (two tailed), respectively

Table 9 shows that the coefficient of *BTC·Ln*(*BTD*) is significantly positive in both Columns (1) and (2). This result confirms that our argument in H2 applies to both book–tax differences due to earnings management and those due to tax aggressiveness. This finding is corroborated by the significantly positive coefficients of *Ln*(*BTD*) in both Columns (1) and (2), which suggest that both sources of book–tax differences induce concerns for auditors.

Moreover, we repeat Eq. (3) by including the interaction term between *BTC* and *Ln*(*ACC*) and find that this interaction term is positive and significant at the 1 % level. Because higher total accruals indicate a higher likelihood of earnings

management, this finding confirms that the effect of book–tax conformity on reducing audit fees is mitigated among firms with greater concern for earnings management.

6 Conclusions

Our study provides evidence to show that a possible benefit of increasing book–tax conformity is a reduction in audit fees. Our empirical results imply that the magnitude of the reduction in audit fees is economically significant, where a 10 % increase in our measure of book–tax conformity explains about a 2.6 % reduction in our sample mean audit fees. We find that firm-level book–tax differences are positively associated with audit fees. We also find that the negative association between audit fees and country-level required book–tax conformity is mitigated among firms with larger book–tax differences.

Our study jointly tests whether increased book–tax conformity reduces audit effort as well as audit risk and whether auditors charge lower fees accordingly. In this regard, we find that increased book–tax conformity is associated with lower deferred tax expenses and with a lower likelihood of financial restatements, which suggest that increased book–tax conformity can reduce audit effort and audit risk, respectively. Therefore our finding about a negative relation between audit fees and book–tax conformity is attributed to our argument instead of other confounding interpretations. Our results provide a concrete conclusion regarding the type and magnitude of the benefit of increasing book–tax conformity. In this regard, our study offers both theoretical and empirical guidance about the association between book–tax conformity and audit fees.

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